THE ATOM

Los Alamos Scientific Laboratory — December, 1966

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THE ATOM

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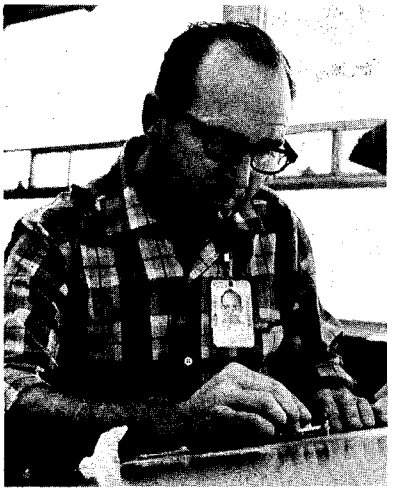

COVER:

Artist Hal Olsen, alternate D-3 group leader, trimmed The Atom's cover Christmas tree with "ornaments" familiar to LASL employes. A story on the Vela satellites begins on page 6, with a picture series of the recent eclipse expedition following on page 11. A story on Test Cell C, "home" of the Kiwi and Phoebus reactors, begins on page 15.

short subjects

A Los Alamos Scientific Laboratory Visiting Staff Member, **Prof. Leona Marshall** of the University of Colorado physics department, has been awarded a $325,000 grant by the AEC to continue her research into atomic structure. The new grant brings the amount awarded her for research to more than a million dollars in the past three years. Working with her in the study are Dr. Vincente Domingo, research associate, and assistant professors George Fisher and Jay B. Kopelman. Dr. Marshall serves as a consultant to LASL. Her husband is Dr. John Marshall, P-17 group leader.

Robert H. Masterson, formerly assistant information officer at Brookhaven National Laboratory, New York, has joined the public relations office as a technical information specialist.

Masterson, 34, is a native of Pittsburg, Kans. He received his B.S. degree in physics from the University of Kansas in 1957 and spent the academic year 1957-'58 at the University of Munich, Germany, as a Fulbright Scholar. Upon return, he worked at Remington Rand Univac in St. Paul, Minn., while attending the University of Minnesota. In April, 1959, he joined Hanford Laboratories at Richland, Wash., as a physicist in the critical mass physics group, a position he held for three years until going to Brookhaven in 1962. There, he worked in the plans and reports section of the director's office before moving to the BNL public information office in January, 1964.

Masterson is a veteran of the U.S. Army and a member of the American Nuclear Society. He is joined in Los Alamos by his wife, Jeannene, and son, Robert, 8.

William E. Stein, P-2, will spend the coming year at the Atomic Energy Research Establishment, Harwell, England. Under a cooperative reciprocal exchange agreement between the United Kingdom Atomic Energy Authority and LASL, Stein will work in several areas of physics research at AERE. Coming to LASL from AERE under the exchange will be D. L. Allan, Harwell physicist. Allan will work in P division.

Stein received his B.S. degree in electrical engineering from the University of Virginia, his M.S. degree in physics from Stanford University, and his Ph.D. degree, also in physics, from the University of New Mexico, where he was an Advanced Study Program participant.

Stein left for his change-of-station assignment last month.

The Alfred Jurzykoski Foundation of New York has selected **Stan Ulam,** LASL research advisor, "for one of this year's millenium awards in the arts and sciences."

The award consists of a citation and $1000.

The announcement of the honor was made in late November at the First Congress of Scholars of Polish Background at Columbia University. The award will be presented at a Jan. 18 dinner in New York City.

Harold Agnew, W division leader, presided over a recent business session of the Army Scientific Advisory Panel meeting at Fort Bliss, Texas. Agnew is chairman of the 26-member group of military and civilian experts which advises the Army on matters relating to defense systems. The group received a briefing on several weapons systems including the Nike-X, Chaparral, Vulcan and Redeye defense missiles. Purpose of the meeting was to bring the panel up to date on its various duties and responsibilities.

more short subjects . . .

Dr. James L. Tuck, associate P division leader, was guest speaker at a fall science seminar for high school students held Nov. 19 on the campus of Southern Colorado State College in Pueblo. The seminar was sponsored by the South Central Zone of the Colorado-Wyoming Junior Academy of Science. Dr. Tuck's talk was titled "Project Sherwood—The Struggle to Gain Nuclear Energy from the Light Elements."

Berlyn Brixner, GMX-9 group leader, was informed recently that he is the 1966 winner of the Robert Gordon Memorial Award. The award was presented by the Society of Photo-Optical Instrumentation Engineers for Brixner's "advancement of photographic instrumentation as a science of observation recording and measurement". Accompanying the award was a $100 honorarium.

Prof. Henry Taube, consultant to CMF-2 since 1950 and now with the department of chemistry of Stanford University, is this year's John Gamble Kirkwood award winner.

The award, established in 1960 by the Yale University Chemists' Association, is granted periodically to an outstanding chemist by the New Haven, Conn., section of the American Chemical Society. The award is made in memory of Prof. John Gamble Kirkwood, former head of Yale's chemistry department, who died in 1959.

Dr. Taube was presented the award November 10 in New Haven.

Harry F. Schulte, H-5 group leader, was recently elected to a three-year term as a director of the American Academy of Industrial Hygiene as the result of a poll held by the diplomates of the American Board of Industrial Hygiene.

Five Long-Time LASL Employes Retire

Five long-time employees of the Los Alamos Scientific Laboratory retired during November.

Dorothy Tully, assistant group leader of SP-12, retired Nov. 22 after more than 20 years with LASL, both in Los Alamos and in the LASL Los Angeles purchasing office. Dorothy joined the Laboratory as a clerk in what was then A-4. In 1948, the group became SP-4. In 1962, she transferred to Los Angeles, and when that office closed in 1965, returned to Los Alamos.

She has been active in civic affairs, serving as secretary of the local Red Cross chapter when it was chartered, and president of the Los Alamos Business and Professional Women, as well as state treasurer of the organization.

Dorothy calls California home and has already left for Alhambra, where she'll keep house for her husband, W. W. Tully, who is vice president of the U.S. Termite Control Corporation, Ltd., Pasadena. Her daughter is Mrs. Joyce Headdy of White Rock.

Lucille G. McQuillan, H-1 film badge technican, retired Nov. 30. She came to Los Alamos for the first time as a WAC in 1944, and in April, 1946, became a civilian employee in CMR-12 until September, 1946, when she left Los Alamos. She returned in December, 1948, with CMR-3 and in 1955 transferred to H-1.

A native of Houston, Texas, Lucille and her husband, also retired, recently bought a new home on Tewa Loop, Los Alamos. They plan to travel next spring, but in the meantime Lucille finds bowling three times a week keeps her busy enough.

Denton T. Doll, alternate group leader of CMB-6, retired Nov. 18. He joined LASL in April, 1949. A native of Ohio, Doll received his B.S. degree in metallurgical engineering from Case Institute of Technology, and his M.S. degree in the same field, also from Case. He is a member of the American Society for Metals. Prior to coming to Los Alamos, Doll worked for the Brush Beryllium Co. in Cleveland. He is now living in Albuquerque.

Vincent L. Moreland, tool crib attendant with LASL since 1947, retired Nov. 4. He started work with Group A-3 as a junior machinist, later transferring to ENG-3 in 1948, and to SD-1 in 1949. Two years later he moved to the Shops Department office. He is now living at his home in Chimayo.

Ernesto Romero, CMF-9 technician, retired Nov. 18. He hired on with LASL in June, 1951, as a lab assistant for CMF-9 and has been with the same group continually. As a young man, he worked at the Los Alamos Ranch School as a farmer and handy man. From May, 1947, to January, 1949, he worked for the Zia Company in the auto and tire shop and was also employed by the Los Alamos Medical Center from 1949 until he joined the Laboratory in 1951.

Romero will live in Espanola.

Boy Scouts Trek to the Woods for Trees

Cliff Loucks, Troop 329, takes a long downhill walk with his contribution to the tree harvest. Scouts and their father assistants cut nearly 1000 trees in the Jemez for sale to Los Alamos residents at the Boy Scout Lodge lot.

Troop 22 moves out for Operation Christmas Tree. Left to right are Steve Noyes, Pat Stevens, Mark Stevens, Greg Ochsner, Eddie Weinbrecht, Scoutmaster Casey Stevens, J-10; Horace Noyes, Andy Yeamans, Jim LaMonica, Mike Sterkel, Dale Stone and Ken Jennings.

Chris Holm, Troop 329, tops a fir, leaving enough growing tree to produce another Christmas decoration a few years hence.

. . . Hill Boy Scouts Conduct Annual Christmas Tree Sale . . .

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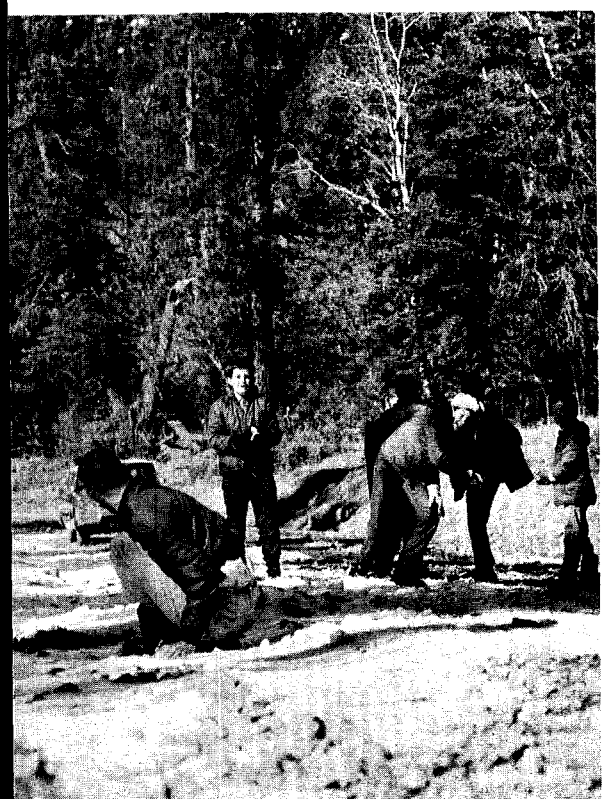
Photos by Bill Regan

John N. Stewart, J-15, ducks a snow ball barrage from Mike Grothus, John Newcomb and Ted Grothus. . .

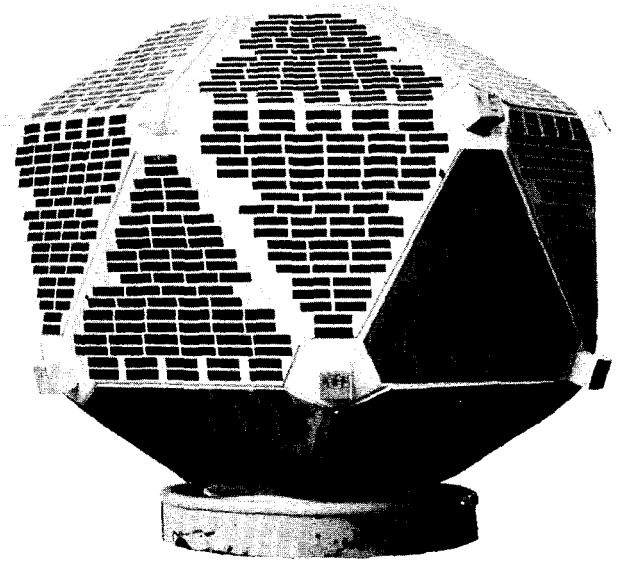


. . . but they eventually score a direct hit.

John Newcomb is a good target for a well-aimed snowball.

Horace Noyes, SP-DO, who solves big logistics problems during the week for the Laboratory, takes personal charge of a small one during the annual Boy Scout Christmas tree harvest.

All hands pitch in to load the trucks with trees, which are now on sale at the Boy Scout Lodge.



LASL

By BILL RICHMOND

Early on a spring morning next year, a giant Titan 3-C rocket will rise in eye-deceiving slow motion from a launch pad at Cape Kennedy.

The payload for this rocket will be the culmination of more than 18 months of work by personnel of the Los Alamos Scientific Laboratory and Sandia Laboratory in Albuquerque.

Launch IV in the Vela "Eye in the Sky" program is tentatively scheduled for lift-off in March, 1967. Perched on top of the giant rocket will be two satellites that will be placed in orbit some 70,000 miles up. They will join six other satellites in the program which have been launched—in pairs—on three different occasions.

The initial launch of the Velas (which means "vigil" in Spanish) took place Oct. 16, 1963. At that time the whole subject was considered so hush-hush in some quarters that the preparations for Launch I were described by one member of the news media as ". . . so secret that even the fact that it's a secret is a secret . . ."

Since the launch of the first pair of satellites, two other launches—in 1964 and 1965—have carried four other 20-sided satellites into near-perfect orbit a third of the way to the moon.

And in each case the instruments aboard the satellites were designed and developed by LASL and Sandia.

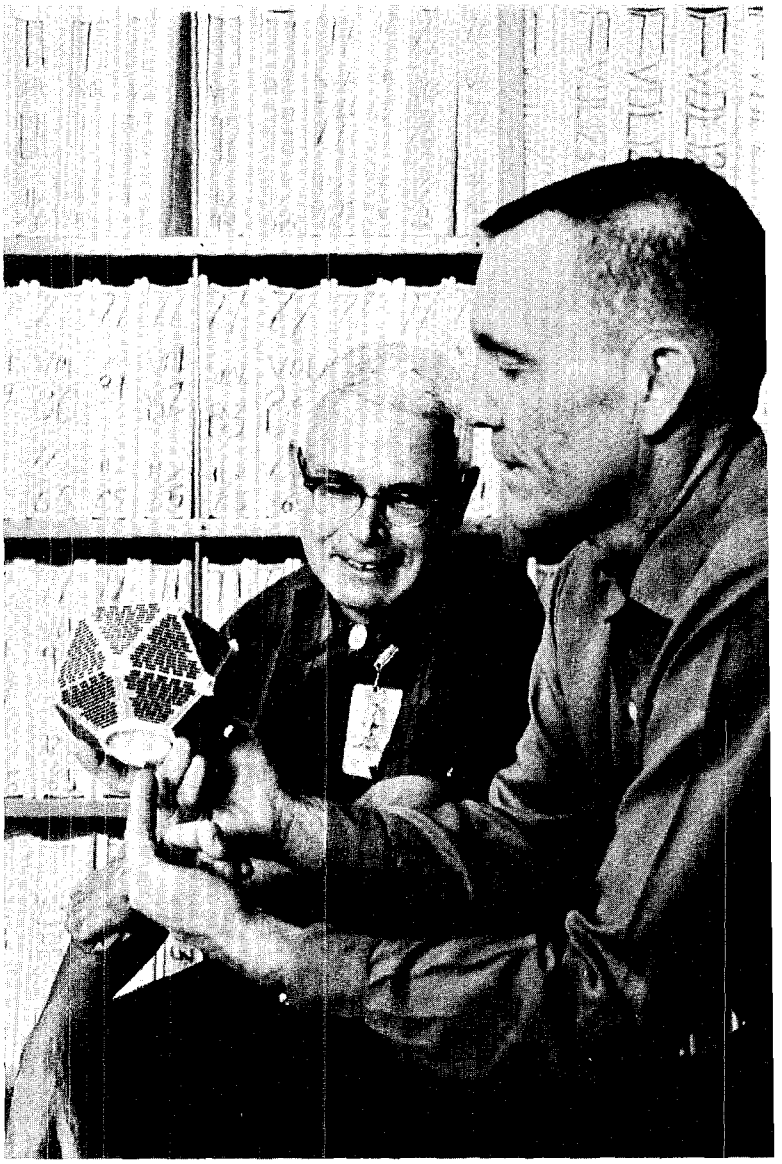
The first two orbiting "eyes" celebrated their third anniversary as space watchdogs last October. And, as a surprise to some, they are still functioning. This makes them the oldest continuously operating U.S. spacecraft still providing useful data.

An announcement of Launch I's third anniversary noted, "The Vela satellites have grown in sophistication, size and scope so that they can now participate in nuclear test detection missions from the surface of the earth to deep space." It was publicly revealed for the first time that the orbiting instrument packages could "find and record nuclear tests near the surface of the earth."

The Vela program was initially a result of the 1958-'60 Geneva Nuclear Test Ban negotiations between the United States, the Soviet Union and Great Britain. It was decided at that time the United States should have a means of determining whether the moratorium on nuclear testing was followed, and the Vela project was born.

After the moratorium was broken and further testing was conducted, work on the "Eye in the Sky"

Instruments Watch The World



Harold Argo (left), P-4 alternate group leader, and Jim Coon, P-4 group leader, examine model of Vela IV spacecraft. A small part of the thousands of volumes of data from previous launches fills the shelves in the background.

speeded up, and Launch I occurred a little more than three months after the Test Ban Treaty was signed in 1963.

Although a primary purpose of the Vela program is to detect clandestine testing, a variety of other useful data has been acquired. James Coon, P-4 group leader at LASL, said, "Vela has discovered new properties of the solar wind plasma. For example, its temperature sometimes falls to much lower values than had been thought . . . as low as 5,000 degrees kelvin . . . although sometimes its temperature approaches a million degrees, which is nearly that of the corona near the sun.

"The solar wind is observed to be twice as hot along the directions of the interplanetary magnetic field as in perpendicular directions," he said.

"Also," Coon added, "the solar wind does not blow directly away from the sun as had previously been thought, but instead it flaps around like a typical spring breeze, and, on the average, flows from the 'east' side of the sun. New features of the plasma in the outer regions of the earth's magnetic field have been observed (by the Velas)."

LASL and Sandia are the two laboratories provid-

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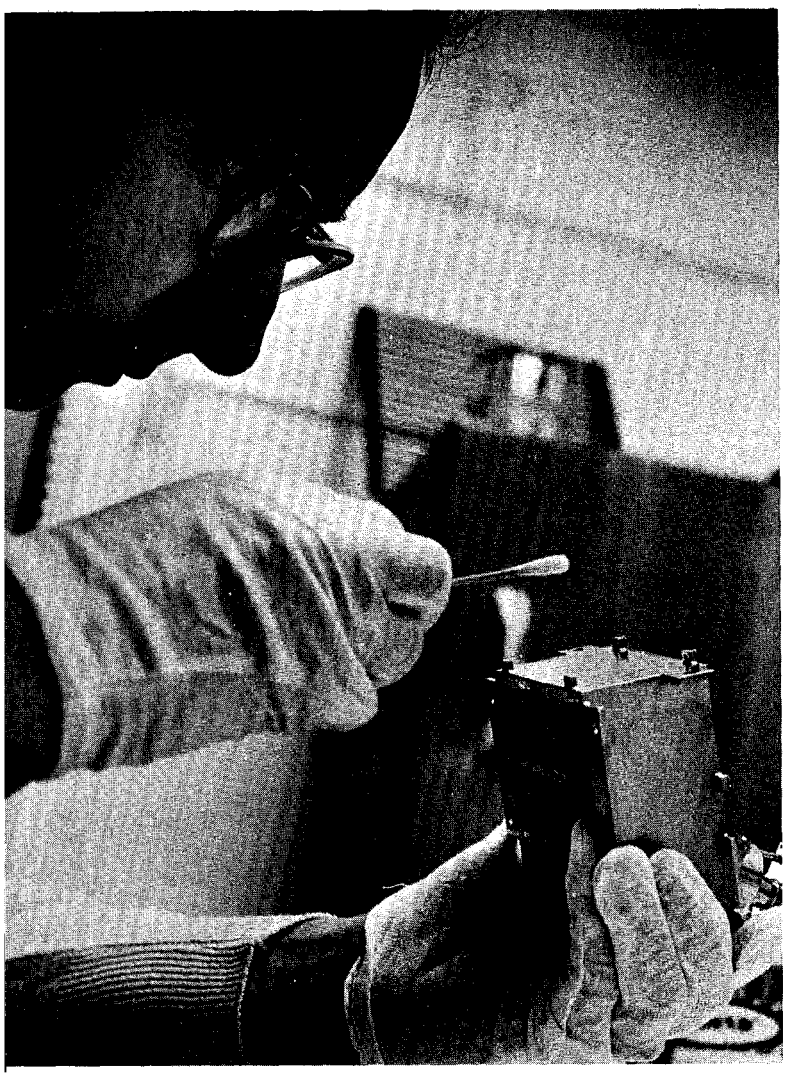
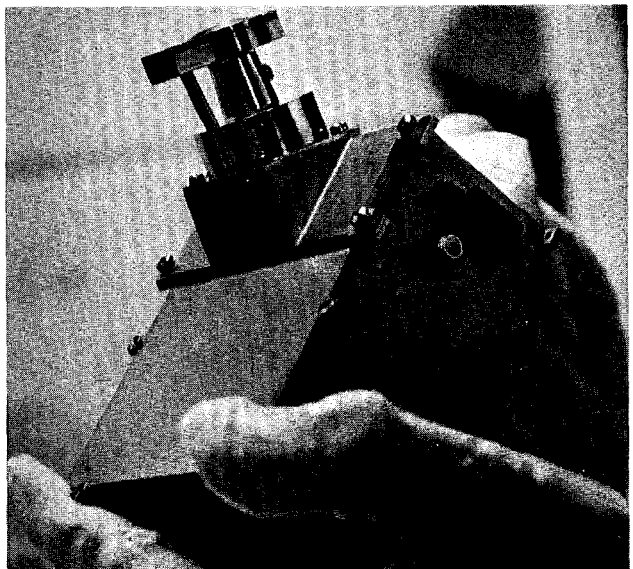


Myrna Mutchler, P-4 technician, cleans a gold-plated telescope which will be a part of the Vela IV instrument package. This unit, with three solid state detectors, is part of a system to measure and analyze protons and alpha particles from rare solar proton events.



Eye in the Sky . . .

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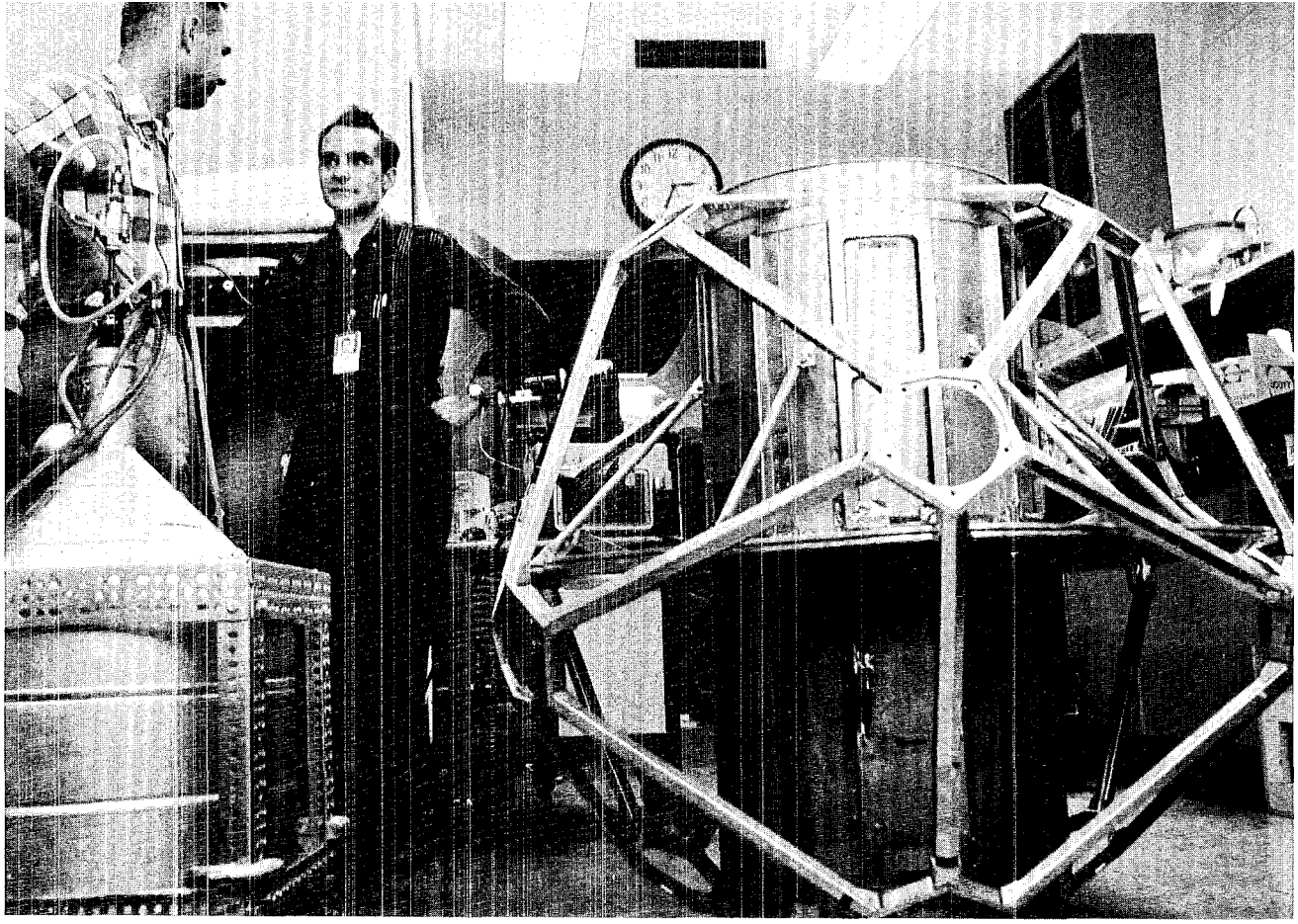
ing the instrument payloads for all Vela launches, including the sensing devices and instrumentation contained within the satellites.

The original purpose of the orbiting space watchdogs was to see nuclear explosions in outer space and high in the earth's atmosphere. However, Velas 5 and 6 in Launch III also contained optical instruments and electromagnetic pulse (EMP) to see down to the earth's surface. These were built by Sandia and were of a relatively experimental nature because the decision to place them on the satellites was not made until late in the planning stages.

However, Coon says, Launch IV will have more advanced optical equipment.

LASL's P-4, or space science group, is concerned primarily with the development of instruments to detect x rays, gamma rays and neutrons. These radiations are emitted by nuclear explosions in the vacuum of space and high in the atmosphere. About 25 members of P-4 work full-time on the Vela program.

J-10, under the direction of Herman Hoerlin, group leader, has provided Sandia with information on what source characteristics to expect while Sandia



Jerry Conner and Ray Klebesadel, both P-4, talk over details for spring launch of another Vela satellite package. Framework from an early Vela spacecraft mockup is in foreground.

was designing the optical equipment. J-10 is considered expert in this field because it has been working on this type of information for years for earlier U.S. atmospheric tests. A section of W-7, under Bill Chambers, alternate group leader, also is concerned with the Vela project, Coon noted, while P-1 under Paul Glore, section leader, handles the electronics.

P-4 also concerns itself with eclipse missions—such as the recent one in South America—in efforts to determine natural background interference from the sun to improve future instrumentation. Harold Argo, alternate group leader of P-4, in addition to his work with Vela was in charge of the P-4 contingent on the eclipse mission.

Coon pointed out that there are also x rays, gamma rays and neutrons emitting from the sun. Instruments on the Velas check the background problem from the sun and the earth's galaxy.

Coon noted that there are galactic cosmic rays which can stimulate detectors and cause signals which interfere with the primary purpose of the detectors.

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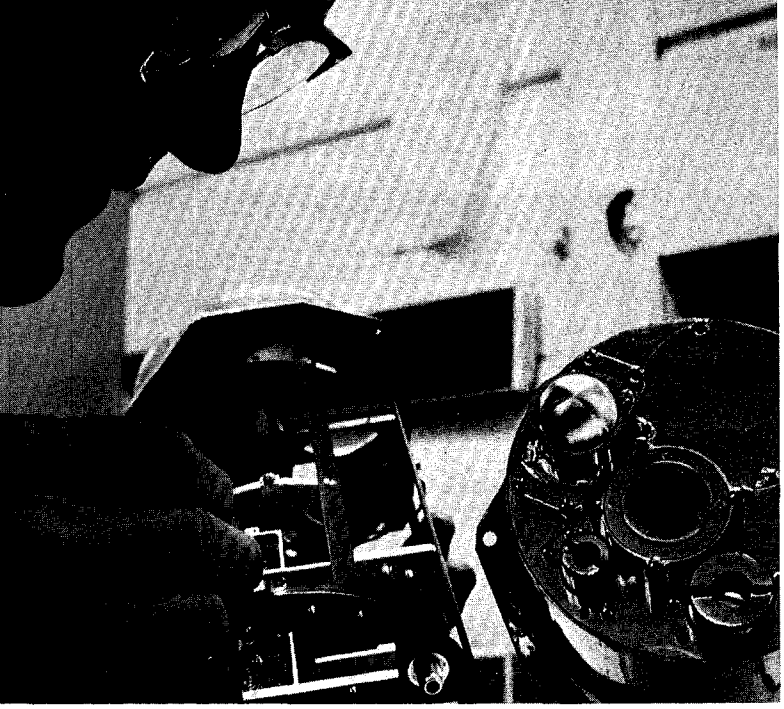
Pauline Stone, P-4, installs window structure in x-ray detectors. A completed unit is in foreground.



Ralph Greenwood, P-4, assembles solar telescope detector for upcoming Vela Launch IV. Unit at right is a Geiger counter assembly which is a part of the detector package.

Eye in the Sky . . .

Continued from preceding page

"The work of investigating the natural background led us into a nice space research program," Coon said. "Vela is getting excellent information concerning solar winds and their interactions with the earth's magnetic field."

The six Vela satellites now orbiting the earth are icosahedrons (from the Greek 'eikosi' meaning 20) and are about four feet in diameter. The two payloads aboard Launch IV will be improved spacecraft with 26 sides and slightly larger in size.

A Vela satellite has 12 points with detectors in each point. A cluster of other detectors and instruments—including a transmitter to send data earthward—is contained inside the satellite.

Mounted on the outside "skin" of the satellite are surface panels composed of solar cell units that supply the electrical power to the electronics. Power is held in storage batteries to help stabilize the electrical power system and to assure continuous operation on those rare occasions when the satellite is on the dark side of the earth away from the sun.

For launching, the two satellites are mounted in tandem inside a breakaway nose cone atop their launch vehicle. The rocket carries them to about 70,000 miles where the nose cone falls away and the two Velas separate.

At that point in time and space, an injection motor—mounted in the center of each spacecraft—fires and sends one of the satellites into a circular orbit. The second space watchdog is allowed to make a natural elliptical orbit that swings it around the earth about 200 miles out and then returns to the original apogee.

When it reaches this point its injection motor fires and the second package also enters a circular orbit. The first Vela has by this time traveled to a point about 180 degrees, or 120,000 miles, distant. The two are then in exact orbits about 30 earth radii apart.

Four tracking stations located on various parts of the earth's surface pick up the data transmitted back from space. This data is then analyzed and interpreted.

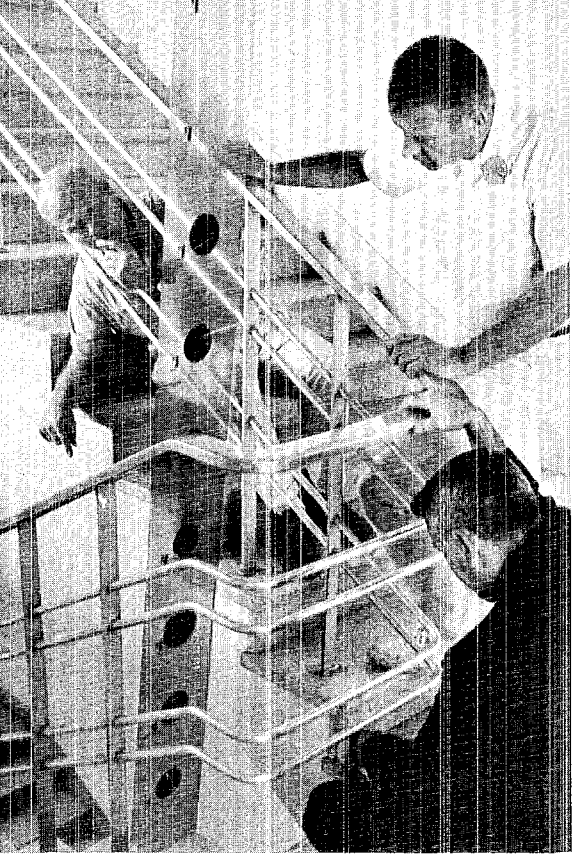
Since the initial launch more than three years ago, far beyond the Van Allen radiation belts, more than 400 billion bits of data have been sent back home by the six orbiting instrument packages.

As an Atomic Energy Commission announcement noted recently:

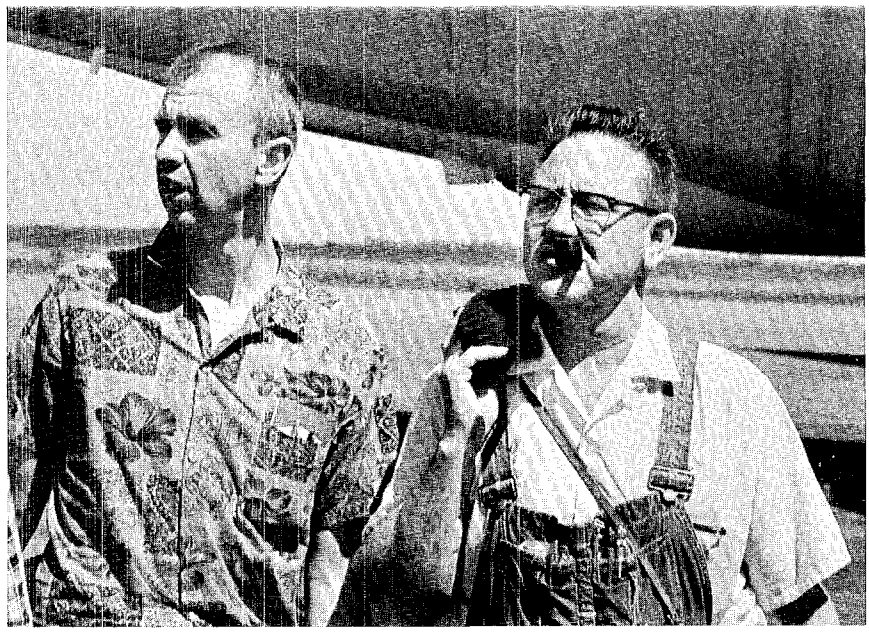
"This record of scientific and engineering achievement is due in large part to the efforts of the Atomic Energy Commission's Los Alamos Scientific Laboratory and the Sandia Laboratory: LASL for the design of sensor systems and Sandia for the logics systems which record the signals and convert them to electronic intelligence."

Coon noted that Launch V in the Vela program is scheduled for 1968 which is a year of peak solar activity in the 11-year cycle of the sun. There are no definite launch dates set beyond Launch V.

But data already accumulated, plus never-ending research at LASL, means that Launch V will have more advanced instruments than those aboard previous satellites. And when further launches are planned, these, too, will be better equipped for their mission as America's "Eye in the Sky."



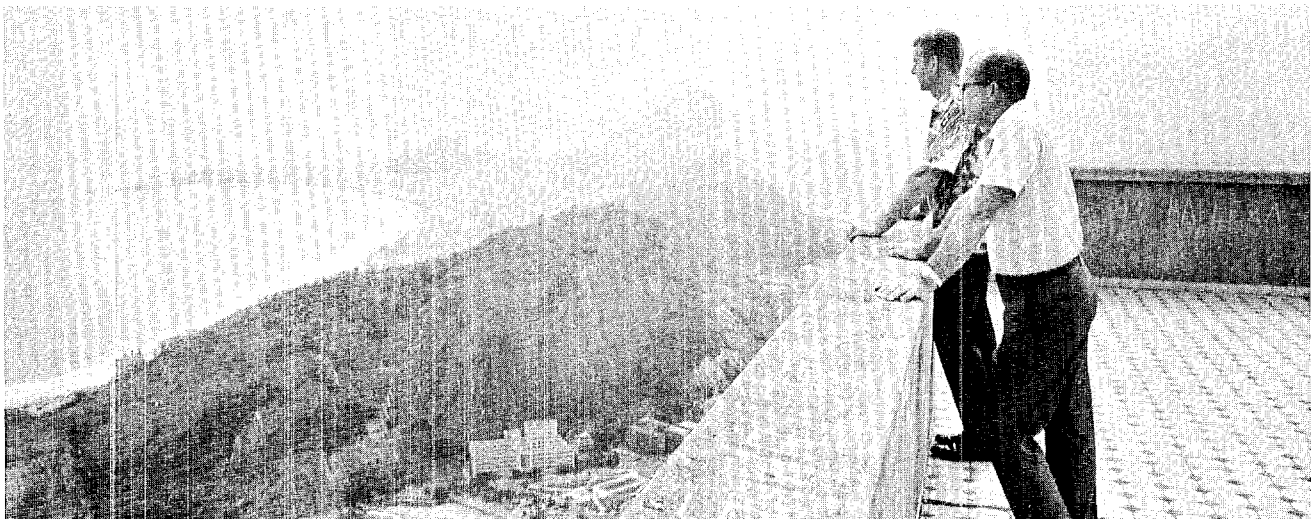
Deep stairwell at hotel in Buenos Aires serves as a drying rack for several hundred feet of film taken by the corona camera on pre-eclipse practice flight. Scolman, Eugene Lamkin, D-8, and Winslow check images on the nine-inch-wide film.

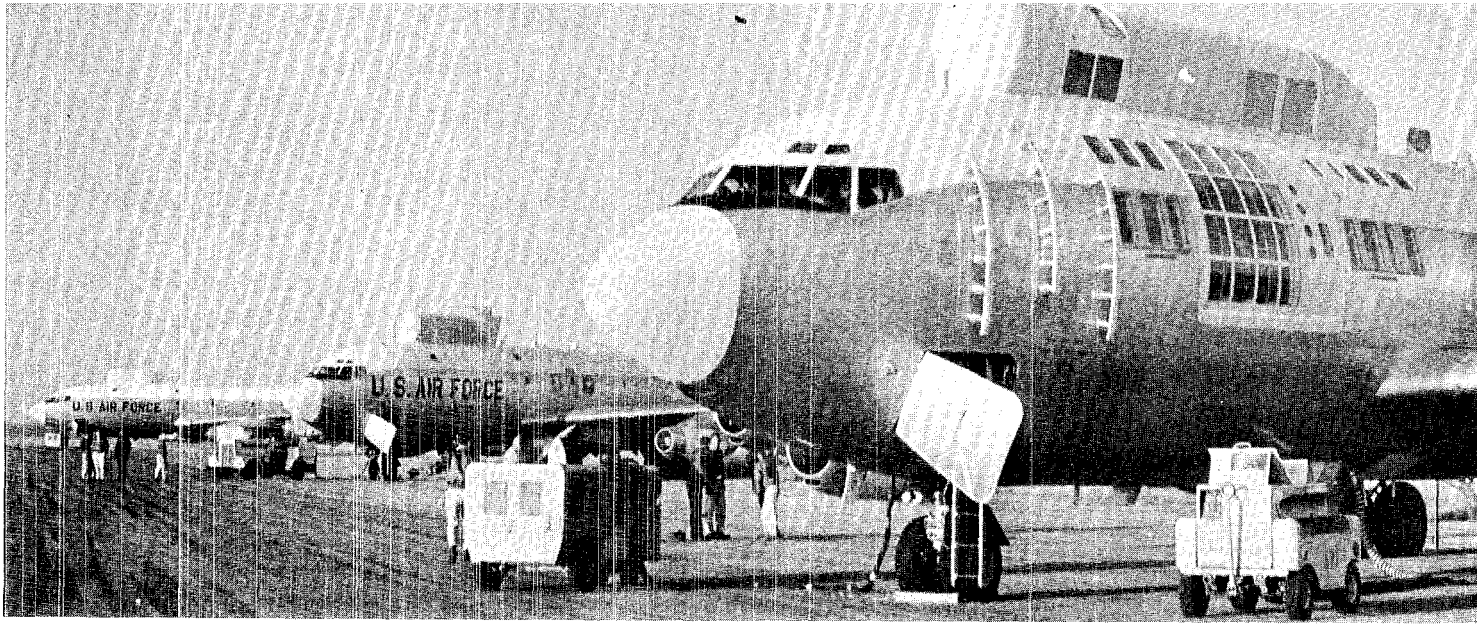


Cox and William Ogle, J division leader and scientific coordinator for the three eclipse planes, disembark after eclipse flight.

Though there wasn't much time for sightseeing in the rush of preparations for the eclipse flight, Scolman; Robert Lang, N-4; Winslow and Strait managed a short walking tour of Buenos Aires.

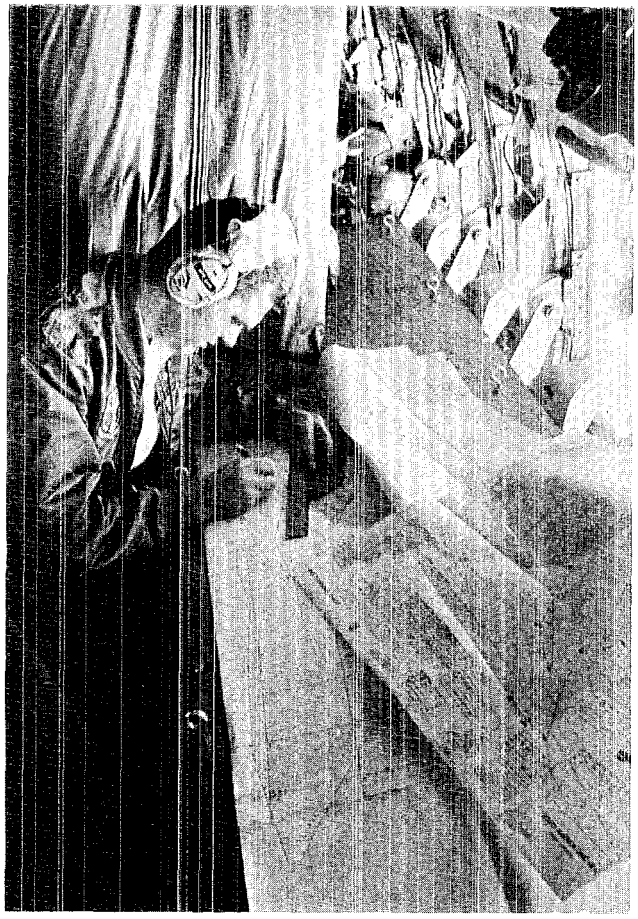
Lamkin and Lang took advantage of a brief stop in Rio de Janeiro to see the view from the top of Sugarloaf mountain.





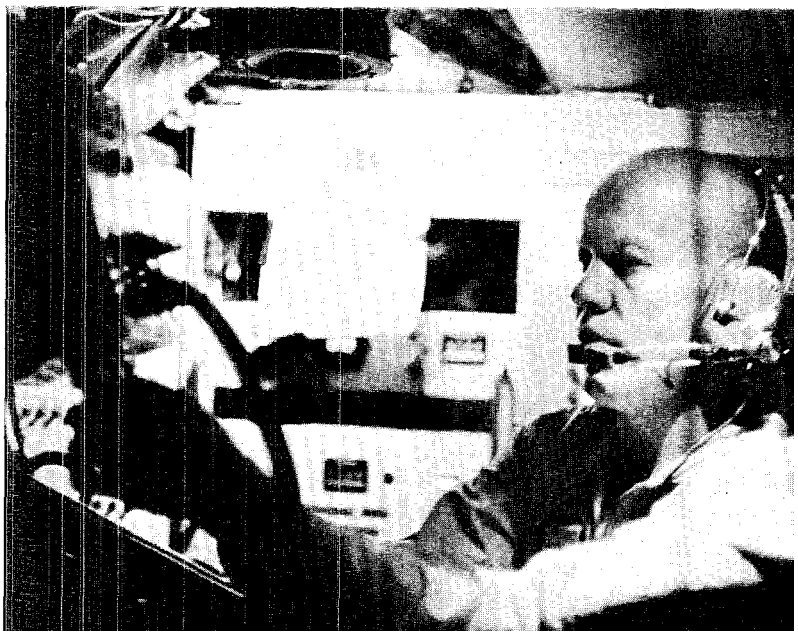
Flying laboratories line up on taxi strip at Ezeiza airport, Buenos Aires, headquarters for the Nov. 12 eclipse flights. LASL plane is at left, along with planes from the Sandia Corporation and Lawrence Radiation Laboratory.

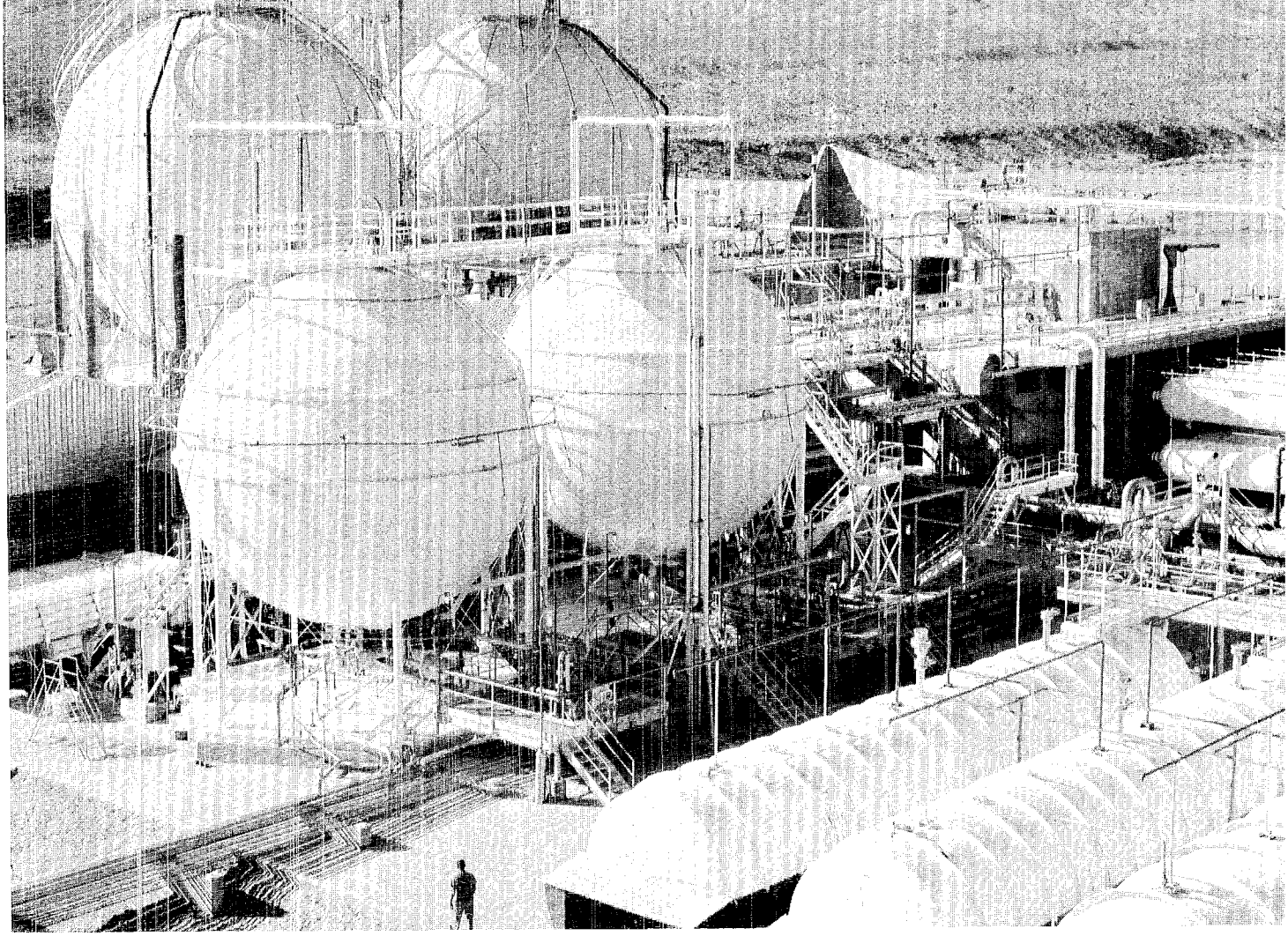
Air Force Capt. Richard Barr, one of the navigators on LASL's plane, calculates changes in course.



Bobby G. Strait, N-4, worked on servo systems on the flight.

Ted Scolman, J-8, makes an adjustment on corona camera equipment.





The two new dewars in the background tower over their older brethren. Tanks in right foreground are for liquid nitrogen.

Test Cell 'C' Expands For Phoebus

By BILL RICHMOND

With the completion of the Gemini astronaut project and the entry into the Apollo program, a nuclear reactor for a rocket engine comes closer to being a reality.

However, these reactors must be tested on the surface of the earth, and the old test facilities at the Nevada Test Site were not capable of handling the increased power and running time. Thus, the second generation reactors in the Project Rover program required a modification of Test Cell "C" at the Nuclear Rocket Development Station at NTS.

The face-lifting at the test site began in early 1965 and is now essentially complete—at a cost of more than three million dollars.

The modification, required prior to full-scale testing of the Phoebus reactors, was done under the direction of the Los Alamos Scientific Laboratory,

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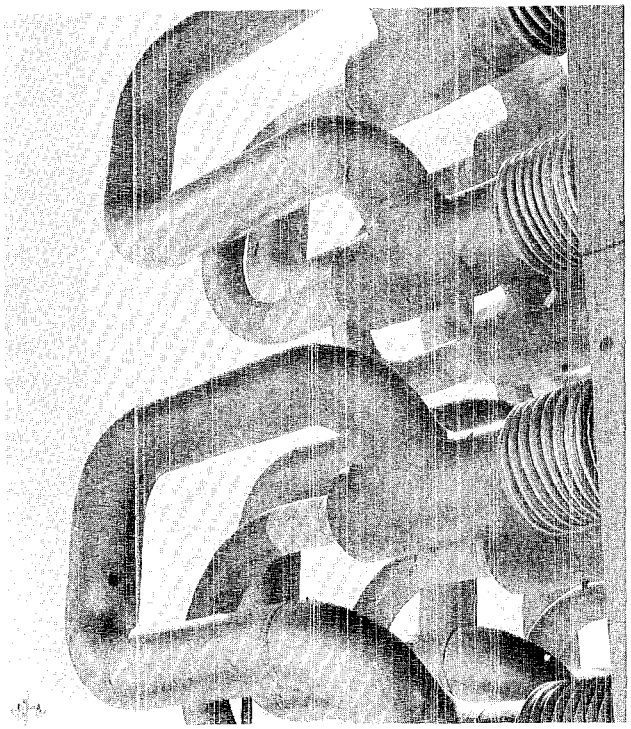
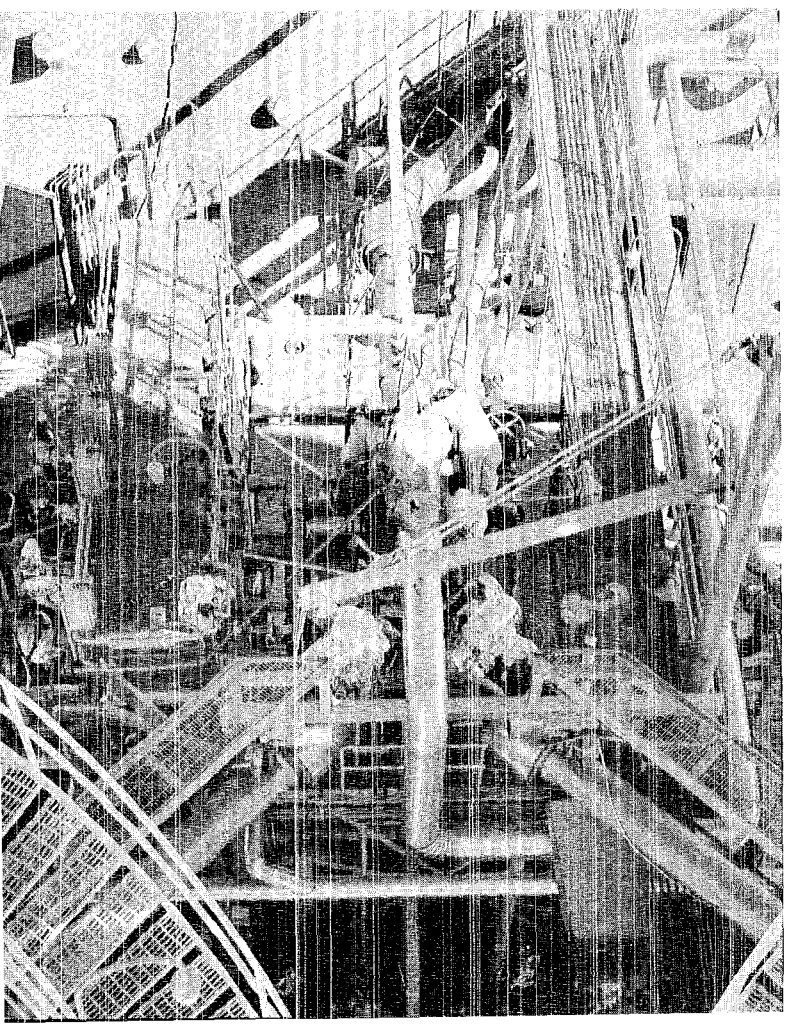


Turbine Energy Source which warms liquid hydrogen to a temperature suitable for turbine supply gas has its own maze of pipes. TES was developed by LASL personnel.

From the top of the two new giant dewars, piping appears to run in all directions in a haphazard manner—but each section has been carefully planned.



Test Cell 'C' . . .

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as was the original test cell design. The modification "team" from LASL was composed of members of groups J-5, J-6, J-9, J-17, J-18 and CMF-9.

The second generation reactors—called the Phoebus series—will have a power level of about 5,000 megawatts. This is nearly five times as great as the Kiwis. The Phoebus running time also will be increased from about 10 minutes to 30 minutes.

Perhaps the most impressive visible aspect of the modification program is two new giant dewars. These dewars are huge double-walled vessels similar to a thermos bottle, made of stainless steel instead of glass.

Before the revamping there were two dewars at the test cell with a capacity of 50,000 gallons of liquid hydrogen each. The storage capacity of the liquid hydrogen was increased to 1,100,000 gallons by the addition of these two 500,000-gallon dewars. This capacity is five times as much as the new Barranca Mesa water tower which has a capacity of 200,000 gallons.

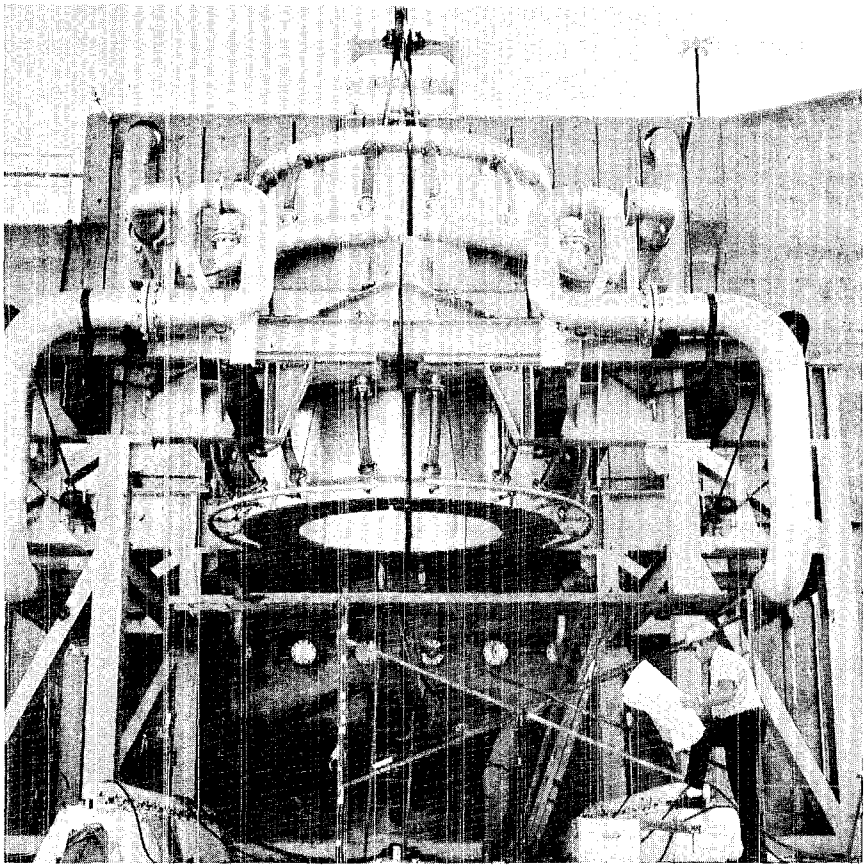
Not visible, but a very important aspect of the modification, is a new underground "hook-up" room. In the Kiwi series, the reactors were moved on rail cars to the test cell and plugged into the cell wall for operating. This mated the electrical and data sensing connections from the reactor to the control point. However, in the event of a malfunction it would be impossible for a man to work near the reactor because of the radiation.

But the new underground room, directly under where the reactor will be run, is expected to change this. The connections will be plugged into this room, and the shielding under the reactor will be sufficient to allow a man to work on the hundreds of wires in the event of a mishap. A technician could work for a limited time under the reactor without adverse affect.

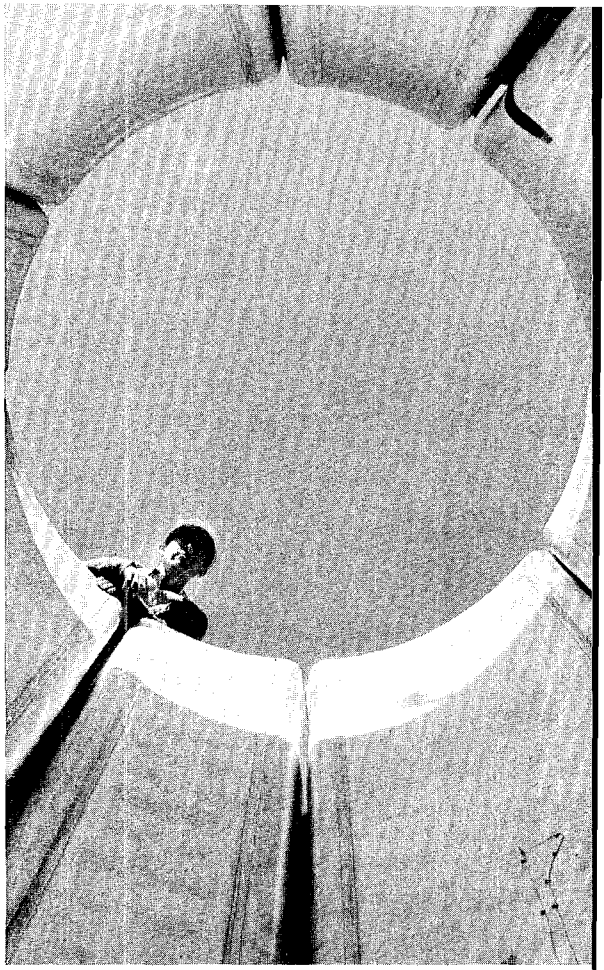
Another area expanded under the modification program was the tank farm. This area is used for storage of gaseous nitrogen, hydrogen and helium. Previously the farm consisted of 12 high-pressure bottles holding about 350,000 standard cubic feet of gas each at 3,500 psi for a total of 4,200,000 standard cubic feet. Four gaseous nitrogen bottles, each holding about 200,000 standard cubic feet of gas at 2,500 psi, have been added recently.

As a comparison, the German airship "Hindenburg"—which exploded and burned at Lakehurst, N. J., in May, 1937—contained about 5,000,000 cubic feet of hydrogen gas.

The Test Cell "C" tank farm now consists of two large bottles of helium, six large bottles of hydrogen and four large bottles plus four smaller ones of nitro-



The radiation shield for the Phoebus 1-B reactor—to be tested early next year—is positioned near the test cell wall.



Bert Knight, assistant J division leader, looks through the reactor shield.

gen. The tank farm is constructed and piped in such a manner that it is not too difficult to change from one element to another.

Another major item in the project was the addition of one high-pressure liquid hydrogen dewar with a capacity of 8,000 gallons, used to supply emergency flow to the reactor should the normal turbopump system fail during operation. The high-pressure dewar system also includes six gaseous hydrogen storage bottles each holding about 2,600 standard cubic feet of gas, or 15,600 total. This gas is used to force the liquid hydrogen from the high-pressure dewar if an emergency arises.

A Turbine Energy Source (TES), which is a liquid hydrogen water heat exchanger developed by LASL, has been installed. The purpose of the TES is to warm the liquid hydrogen to a temperature suitable for turbine supply gas.

Three 28,000-gallon liquid nitrogen dewars and a Reactor Cool-Down Vaporizer (RCV), which is a water heat exchanger that converts the liquid nitrogen to gas, were also added. The nitrogen is used to remove the after-heat in the reactor at the end of a run.

Two liquid nitrogen pump vaporizers have also been added. They are used to take the liquid nitrogen out of the dewars, convert it to gas and fill the nitrogen bottles of the tank farm. The pumps have a capacity of 50,000 standard cubic feet per hour each.

Previously there was one liquid hydrogen pump vaporizer used to fill the high pressure bottles at the test cell with a capacity of 30,000 standard cubic feet per hour. To this will be added one liquid hydrogen pump vaporizer with a capacity of 90,000 standard cubic feet per hour.

The ground water storage tank of 150,000 gallons was modified to 250,000 gallons and a mixing tank for the borated water system was added. This is for use for the reactor shield and privy roof cooling. No change was made to the existing elevated water

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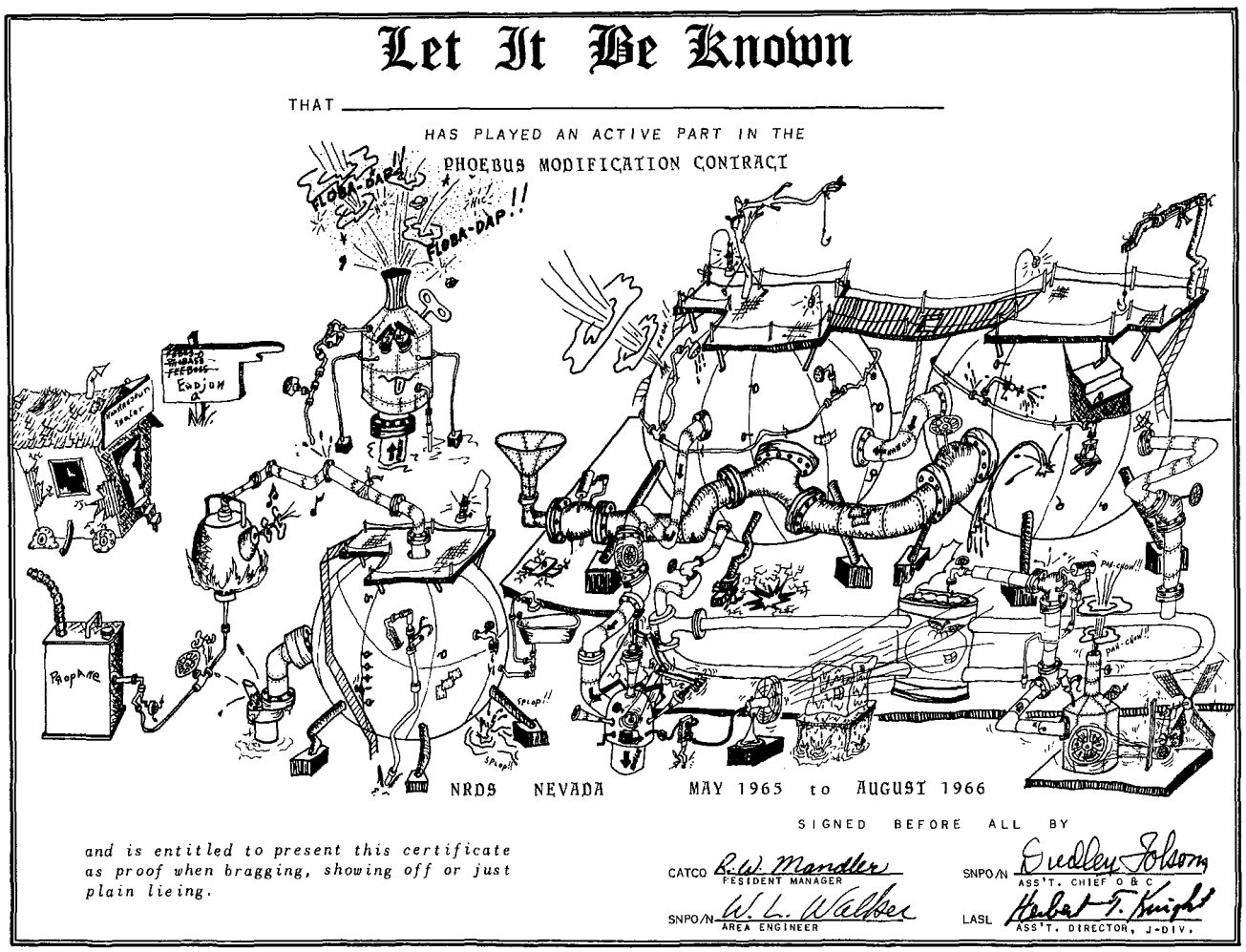

Paul Des Marais, an electrical inspector for Catalytic Construction Co., drew cartoon for Phoebus Modification Contract certificate. Catco was the procurement and inspecting agency for Test Cell "C" modification program.

Test Cell 'C' . . .

Continued from preceding page

storage tank which has a capacity of 150,000 gallons.

Another addition was a 225,000-gallon hot water sphere that supplies 210° F water to the RCV and the TES. A boiler-type water heater was added as part of this system. This hot water storage is thus the energy source which is used to drive the turbopumps during full power operation.

A thermal-spray system for putting water spray on the dewars, tank farm, building roofs and other areas of the test cell was installed. During reactor operation the large burning exhaust plume is a significant heat source. The thermal-spray system is used for heat protection from this source during reactor tests and uses the effluent water from the TES.

One 10,000-gallon propane tank was built for use with an earlier 3,000-gallon tank. Propane is used primarily to heat water in the hot water sphere. The propane is also used for the flare system in the burn-off process.

Previously the test cell had one liquid hydrogen turbopump system to supply liquid hydrogen to the reactor. Added was a new liquid hydrogen pump room to house a two-turbopump system. The new pump room is required for the Phoebus reactors and their high flow rates of liquid hydrogen. The flow rate capabilities cover a range up to about 30,000 gallons per minute or 300 pounds per second at discharge pressures up to 2,000 psi.

Thus, with the new facilities—and other additions if needed—Test Cell "C" will be able to carry out its responsibilities in the Rover Project and will play no small part in its contributions to future space travel.

Carco Named For Three-Year Contract

Carco Air Service, Inc., has been selected for negotiation of a three-year contract with the Atomic Energy Commission to provide air service primarily between Los Alamos and Albuquerque and between Las Vegas, Nev., and the Nevada Test Site, Tonopah Test Range and Tonopah, Nev. In addition, Carco will operate occasional flights to other parts of the country and overseas.

Under contract to the AEC, Carco has supplied round trip air service between Los Alamos and Albuquerque since 1948. The airline will begin serving the Nevada locations under the new contract, which will run from Jan. 1, 1967, to Dec. 31, 1969. Previously the Nevada flights were provided by Alamo Airways, Inc., of Las Vegas.

Carco will furnish 13 aircraft of three to nine passenger capacity and will also operate five C-47's and one C-54 owned by the government.

The AEC presented its award of honor to Carco earlier this year in recognition of the firm's outstanding safety performance from 1951 through 1965.

new hires

Accounting Department

Michael T. Cherryhomes, Sr., Los Alamos, AO-3

CMB Division

Joseph E. Nasise, San Francisco, Calif. CMB-3

Engineering Department

Roy A. Haarman, Salinas, Calif., ENG-2

Richard R. Barela, Pasadena, Calif., ENG-3

Jimmie L. West, Springfield, Mo., ENG-3

Sharon L. Klein, Los Alamos, ENG-5 (Casual)

GMX Division

JoAnne C. Martinez, Los Alamos, GMX-3

Fidencio J. Olivas, Lawndale, Calif., GMX-3

Ernest R. Denbow, Cedar Rapids, Iowa, GMX-4

Wilbert D. Breshears, Norwich, England, GMX-7

Raleigh K. Gardenhire, Espanola, N. M., GMX-7

Joaquin Casaus, Jr., Santa Fe, N. M., GMX-8 (Casual)

Reynaldo Morales, Austin, Texas, GMX-11

H Division

Eldon E. Brown, Burkburnett, Texas, H-1

Valonia E. Huebner, Los Alamos, H-2 (Casual)

J Division

John W. Herron, Columbus, Ind., J-7 (Casual-Rehire)

Jack H. Doren, Las Vegas, Nev., J-9, NRDS

Granville E. Hardy, Evanston, Ill., J-11

Marvin V. Harlow, Jr., Oak Ridge, Tenn., J-16

MP Division

Charles W. McCabe, Denver, Colo., MP-2

N Division

Gordon M. Burge, Los Alamos, N-1 (Casual-Rehire)

Personnel

Patricia M. Kreiner, Spokane, Wash., PER-1 (Casual)

Deluvina Cordova, Fairview, N.M., PER-4 (Casual)

P Division

Jon W. Mayberry, Idaho Falls, Idaho, P-2

Paul E. Parker, Livermore, Calif., P-14

Shops Department

Edward J. Munno, Seattle, Wash., SD-1 (Rehire)

Rodney F. Peterson, Los Alamos, SD-1 (Rehire)

T Division

Ronald D. Christman, St. Paul, Minn., T-1

Stanley M. Fisher, Los Alamos, T-1

W Division

Thurman L. Talley, Tallahassee, Fla., W-4

Barbara A. Holler, Iowa City, Iowa, W-7

Ralph R. Fullwood, Troy, N. Y., W-8

Hans Bethe Honored At Symposium

Hans A. Bethe, noted nuclear physicist and T division leader at Los Alamos during World War II, was honored recently at a special symposium at Cornell University in observation of his 60th birthday. Carson Mark, who succeeded Bethe as T division leader, and Herman Hoerlin, J-10 group leader, were among the physicists who attended.

Bethe, who has served as a LASL consultant since returning to Cornell shortly after the war, was one of the physicists who helped develop the theory of nuclear matter. While with the Laboratory he headed the theoretical division, which conducted calculations for the design of the first nuclear devices. Bethe developed the basic theory of the generation of thermonuclear energy in stars, the so-called carbon cycle. He received the AEC's Enrico Fermi Award in 1961.

In addition to Bethe's presentation, "Nuclear Matter," presentations at the symposium included "Ages of Stars" by Bengt Stromgren and "Stability of Matter" by Freeman J. Dyson, both professors at the Institute for Advanced Study at Princeton, and "Current Algebra and Strong Interactions" by Richard P. Feynman, professor of theoretical physics at California Institute of Technology.

The Technical Side

Sixth Conference on Thermal Conductivity, Dayton, Ohio, Oct. 19-21:

"A Parametric Study of Flash Thermal Diffusivity Measurements" by B. H. Morrison, N-1, D. J. Klein, University of Texas, and L. R. Cowder, N-1.

"Thermal Diffusivity of Pyrolytic Graphite from 25 to 1900° C" by B. H. Morrison, N-1, D. J. Klein, University of Texas, and L. R. Cowder, N-1.

Presentation at Postgraduate Course on Fundamentals of Space Medicine, George Washington University, Washington, D.C., Oct. 21:

"Radiation Biology" by W. H. Langham, H-4 (Invited Talk)

Seminar, Argonne National Laboratory, Lamont, Ill., Oct. 21:

"High Temperature Chemical Properties of Selected Refractory Systems" by M. G. Bowman, CMB-3. (Invited Talk)

Presentations at AEC Accelerator Safety Committee Meeting, Brookhaven National Laboratory, and Brookhaven National Laboratory Cryogenic Safety Committee and Physics Department, both Oct. 26:

"Historic and Current Practice in Hydrogen Safety" by Roy Reider, H-3.

Twenty-Ninth Meeting of Physical Plant Administrators of University of California, Santa Cruz, Calif., Oct. 27-28:

"Application of Electronic Data Processing to Maintenance at Los Alamos Scientific Laboratory" by C. A. Reynolds, ENG-4.

Seminar, Aktiebolaget Atomenergi, Studsvik, Sweden, Nov. 3:

"Neutron Time-of-Flight Facilities and Activities at the Los Alamos Van de Graaff Accelerators" by J. C. Hopkins, P-DOR. (Invited Talk)

Slow Neutron Capture Gamma Rays Conference, Argonne National Laboratory, Lamont, Ill., Nov. 2-4:

"Los Alamos Thermal Neutron Capture Facility" by E. T. Jurney, P-2, and H. T. Motz, P-DO.

"Recent Collaborative Results on Ho^{166}" by H. T. Motz, P-DO, and E. T. Jurney, P-2.

"Study of the Co^{59} (n, γ)Co^{60} Reaction" by E. B. Brooks, P-2.

"External Beams and Coincidence Facilities" by E. B. Brooks, P-2. (Invited paper)

Thermionic Conversion Specialist Conference, Houston, Texas, Nov. 2-4:

"Identification of the Ionic Species in a Cesium Plasma Diode" by W. H. Reichelt and L. E. Agnew, Jr., both N-5. (Invited paper)

"Long Term Irradiation of (Fueled) Emitters" by W. A. Ranken, N-5. (Invited paper) CLASSIFIED PAPER

"Optimization of a Thermionic Diode" by C. D. Sutherland and W. A. Ranken, both N-5. (Invited paper)

"Nuclear Thermionic Reactors: Fast Versus Thermal Neutron Spectra" by T. G. Frank, N-5. (Invited paper)

"Viscosity of Cesium Vapors" by C. V. Weaver, N-5, J. S. Philbin, University of Illinois, and T. F. Stratton, N-5. (Invited paper)

"Heat Pipe Capability Experiments" by J. E. Kemme, N-5. (Invited paper)

"Thermionic Nuclear Electric Propulsion" by E. W. Salmi, N-5. (Invited paper)

Seminar, University of Utah, Salt Lake City, Utah, Nov. 4:

"History and Characteristics of Thermonuclear Theta-Pinch Devices" by V. A. Finlayson, P-15.

"Equilibrium States of a Rotating Plasma Column" by J. A. Palsedge, P-18.

Eighth Annual Meeting, Division of Plasma Physics, American Physical Society, Boston, Mass., Nov. 2-5:

"Diagnostics of a Coaxial Cesium MHD Arcjet" by D. B. Fradkin, N-7, A. W. Blackstock and T. F. Stratton, both N-5.

"Explosive-Driven High Field Systems for Plasma Compression Experiments" by R. S. Caird, GMX-6; K. J. Ewing, GMX-3; C. M. Fowler, W. B. Garn and D. B. Thomson, all GMX-6.

"Characteristics of the Scyllacita Theta-Pinch" by D. B. Thomson, R. S. Caird, both GMX-6; V. A. Finlayson, P-16; C. M. Fowler, W. B. Garn, both GMX-6; R. W. Kewish, P-16; and J. L. Tuck, P-DO.

"Holographic Plasma Interferometry" by F. C. Jahoda, P-15, and R. A. Jeffries, GMX-7.

"Comparison of β, n, T_i in High and Low Pressure Theta-Pinch Operation" by G. A. Sawyer, P-15, V. A. Finlayson, P-16, F. C. Jahoda, and K. S. Thomas, both P-15.

"Adiabatic Time Development of Linear Theta-Pinch Plasma Profiles" by R. L. Morse, P-18.

"Dynamical Characteristics of the Dense Plasma Discharge" by J. W. Mather, P-7.

"Image Converter Observations of the Development of the Dense Plasma Focus Discharge" by J. W. Mather and A. H. Williams, both P-7.

"Plasma Confinement in a Caulked Stuffed Cusp Device" by H. J. Karr, L. C. Burkhardt, and J. N. DiMarco, all P-14.

"Reflection of a Hydromagnetic Shock in Coaxial Geometry" by J. A. Phillips and A. E. Schofield, both P-14.

"Laser Interferometry on Large, Low-Density Plasma Experiments" by D. J. Rode, Case Institute of Technology, and J. E. Hammel, P-17.

"Inverse Pinch Pulsed Plasma Gun" by J. Marshall, Jr., Ivars Henins, both P-17, and John Lohr, University of Wisconsin.

"An Invariant for the Oscillator with a Time-Dependent Frequency" by H. R. Lewis, Jr., P-18.

"Radiative Recombination Induced by Intense Laser Light" by H. Dreicer, P-13.

"A High Resolution, Coherent, Light-Scattering Experiment" by M. Daehler, University of Wisconsin, and F. L. Ribe, P-15.

"The Computation of Particle Losses from Cusped and Theta-Pinch Devices" by W. Grosman, New York University, and R. L. Morse, P-18.

"Studies of a Linear Magnetic Dipole Shield Immersed in a Fast Plasma Stream" by J. E. Hammel and R. M. Henson, both P-17.

Southern California Chapter, Society of Packaging and Handling Engineers Meeting, Tahitian Village, Downey, Calif., Nov. 7:

"Packaging Design and Testing for Radioactive Material Shipments" by H. E. Noyes, SP-DO. (Invited presentation)

"Discussion of Nuclear Safety Aspects of ICC Specification 6l. Container" by David R. Smith, N-2. (Invited presentation)

American Society for Metals, LASL Chapter, Los Alamos, N. M., Nov. 8:

"Carbide-Graphite Composites" by Robert E. Riley, CMB-6.

International Symposium on Transplutonium Elements, Oak Ridge, Tenn., Nov. 8-10:

"Some Los Alamos Contributions to Heavy Element Research" by R. A. Penneman, CMF-4. (Invited paper)

"Production of Heavy Elements in Nuclear Explosives" by G. A. Cowan, J-11. (Invited Paper)

American Nuclear Society Chapter Meeting, Iowa State University, Ames, Iowa, Nov. 10:

"Proposed Los Alamos Meson Physics Facility" by F. R. Tesche, MP-5. (Invited paper)

Twelfth Annual Conference on Magnetism and Magnetic Materials, Washington, D.C., Nov. 15-18:

"Magnetic Properties of $PrAl_2$" by C. E. Olsen, CMF-13, George Arnold, and Norris Nereson, both P-2.

"Spin Value and Moment Determination for the Localized Magnetic States of Very Dilute Fe Impurities in Pt and Pd" by M. P. Maley, R. D. Taylor, both CMF-9, and J. L. Thompson, Idaho State University.

Presentation at Physics Seminar, Purdue University, Lafayette, Ind., Nov. 17:

"An Experimental Test of the Rotational Model: M1 Tranisition Rates" by E. M. Bernstein, T-DOT.

Sixth Annual Meeting, American Society for Cell Biology, Houston, Texas, Nov. 17-19:

"Regeneration of Surface Sialic Acid of Cells in Culture" by P. M. Kraemer, H-4.

American Mathematical Society Meeting, La Jolla, Calif., Nov. 19:

"A Condition for No Secondary Bifurcation of Eigenfunctions of Hammerstein Operators" by G. H. Pimbley, T-8.

American Physical Society Meeting, Division of Fluid Dynamics, Stanford, Calif., Nov. 21-23:

"Measurement of a Shock-Induced Polymorphic Transition in Antimony" by R. H. Warnes, GMX-4.

"Multifluid Numerical Calculations of Rayleigh-Taylor Instability" by B. J. Daly, T-3.

"Double Shock Waves in Iron" by B. R. Breed and D. Venable, both GMX-11.

"The Dynamic Tensile Strength of Lead" by D. Venable and B. R. Breed, both GMX-11.

"Studies of the Viscous Bore" by C. W. Hirt, Jr., T-3.

"Transport Effects in Non-Steady Turbulence" by P. Nakayama and F. H. Harlow, both T-3.

"An Equation of State for Iron Assuming an Instantaneous Phase Change" by C. L. Mader, T-5.

Clinical Convention of the American Medical Association, Las Vegas, Nev., Nov. 28:

"Genetic Effects of Radiation" by J. F. Spalding, H-4. (Invited paper)

Seminars at Department of Microbiology, Louisiana State University, Baton Rouge, La., Nov. 28, and Institute for Cancer Research, Philadelphia, Pa., Nov. 29:

"Genetic and Epigenetic Forms of Neurospora Malate Dehydrogenase" by K. D. Munkres, H-4.

International Atomic Energy Agency Symposium on Alkali Metal Coolants—Corrosion Studies and System Operating Experience, Vienna, Austria, Nov. 28-Dec. 2:

"Behavior of Fission Products in Sodium" by J. C. Clifford, J. M. Williams, both K-2, and J. C. McGuire, formerly LASL.

"A Comparison of Three Methods of Oxygen Concentration Measurement in Sodium" by C. C. McPheeters and J. M. Williams, both K-2.

AIAA Third Annual Technical Meeting, Boston, Mass., Nov. 29-Dec. 2:

"Summary of Paper to be Submitted to AIAA Journal" by E. W. Salmi, N-5.

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the technical side . . .

continued from preceding page

American Chemical Society, Southwest Regional Meeting, Albuquerque, N.M., Nov. 30-Dec. 2:

"Purification of Transplutonium Actinides Produced in Underground Thermonuclear Explosions" by K. Wolfsberg and W. R. Daniels, both J-11.

"Characterization of Uranium Dioxide Surfaces by LEED" by W. P. Ellis, CMB-8.

"Organic Synthesis of Polynucleotides by a Sequence Including Both Chemical and Enzymatic Procedures" by F. N. Hayes, H-4, D. L. Williams, T-1, A. W. Schwartz, H-1, and R. L. Ratliff, H-4.

"Basic Proteins of the Chinese Hamster Ovary Fibroblast" by G. R. Shepherd, L. R. Gurley and D. G. Ott, all H-4.

"An Interpretation of the Proton Hyperfine Splitting in the EPR Spectrum of Vanadyl Ion in Vanadium-Doped Zinc Tutton Salt" by W. B. Lewis, CMF-2.

"Simultaneous Use of Two or More Deoxynucleotides 5'-Triphosphates for Polydeoxynucleotide Synthesis with Terminal Deoxynucleotidyl Transferase from Calf Thymus" by R. L. Ratliff, T. T. Trujillo, D. G. Ott, and D. E. Hoard, all H-4.

"The Heats of Formation of Some Terbium Oxides by Isothermal Solution Calorimetry" by G. C. Fitzgibbon and C. E. Holley, Jr., both CMF-2.

"Distribution of Americium Between Liquid Plutonium and a Fuse Salt. Evidence for Divalent Americium" by L. J. Mullins, A. J. Beaumont and J. A. Leary, all CMB-11.

The Preparation and Thermal Decomposition Diagrams of Carbonate Compounds of Th and U" by E. L. Head, CMF-2.

"Alkali Metal Fluoride Complexes of the Actinides" by T. K. Keenan, R. A. Penneman, L. B. Asprey, all CMF-4, and Abraham Rosenzweig, University of New Mexico.

"Description of Large Scale LH_2 Storage and Flow Facilities" by D. H. Liebenberg, K. D. Williamson, Jr., and E. F. Hammel, all CMF-9.

"Engineering Data from the Operation of the LH_2 Facilities at the Nuclear Rocket Development Station" by K. D. Williamson, Jr., D. H. Liebenberg and E. F. Hammel, all CMF-9.

"The Heats of Formation of Thorium Mono- and Dicarbides" by E. J. Huber, Jr., and C. E. Holley, Jr., both CMF-2.

"Auto-Radiolysis of Tritiated Ammonia" by A. H. Zeltmann and A. E. Florin, both CMF-2.

"The Spectrophotometric Determination of Mercury at HgI_4^{2-}" by by I. K. Kressin and J. S. Coleman, both CMF-4.

"The Nuclear Magnetic Resonance of Oxygen-17 in the Uranyl Ion" by S. W. Rabideau, CMF-2.

"NMR Study of Chlorine-35 and Oxygen-17 Relaxation in Hydrochloric Acid Solutions Containing Vanadyl Chloride" by A. H. Zeltmann, CMF-2, and L. O. Morgan, University of Texas.

"Synthesis of Certain Diaryl Ketone Hydrazones, Related Diaryldiazomethanes and the Corresponding Benzhydryl Derivatives of 5'-Thymidylic Acid" by D. L. Williams, H-4, and R. E. Hine, formerly LASL.

"Pressure - Volume - Temperature Relations for Cryogenic Fluids" by E. C. Kerr and R. H. Sherman, both CMF-9.

"Crystal Structure Change in Hydrogen and Deuterium at Low Temperature" by R. L. Mills, A. F. Schuch and D. A. Depatie, all CMF-9.

"Isothermal Annealing Effects in Ammonium Hypophosphite" by V. C. Anselmo, New Mexico Highlands University-ARMU, J-11.

"A Comparison of a Knudson and a Lagmuir Vapor Pressure" by C. C. Herrick, CMF-13.

AEC Releases Two Patents by LASL Men

Two patents with Los Alamos Scientific Laboratory personnel listed as the inventors have been released to the public by the United States Atomic Energy Commission.

The first, "Powder Rolling of Tungsten and its Alloys," is the invention of T. J. Ready, H. D. Lewis and J. E. Hockett, all CMF-13. According to the AEC, "This patent relates to apparatus for powder rolling tungsten or its alloys wherein a constant head of powder is maintained in the hopper by baffle means, one of the lips of the hopper being vibrated by controllable electronic driver means, and each of the rollers being constantly roughened by abrasive means while rotating."

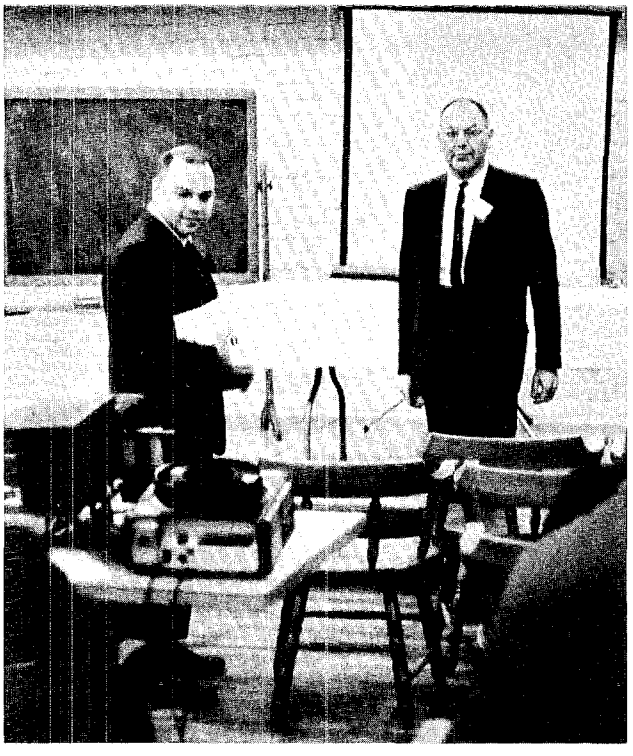
The other, by R. L. Aamodt, L. J. Brown and B. D. Nichols, all J-12, is titled "Method and Means for Improving the Electron Emission from a Refractory Conducting Material." The AEC announcement said this patent relates to an improvement in thermionic emitters wherein both cesium and fluorine are made available for coating the emitter during operation.

LASL Scientists Hold Key Roles At ACS Meeting

Robert A. Penneman, CMF-4, general chairman for the Southwest Regional Meeting of the American Chemical Society, and Joseph A. Leary, CMB 11, technical program chairman, check signals at the early December meeting.

AEC Chairman Glenn T. Seaborg listens attentively to Robert D. Fowler, CMF division leader.

Dr. Arnold F. Fritsh, special assistant to AEC Chairman Glenn T. Seaborg, and AEC Commissioner Gerald F. Tape talk with Wright Langham and Donald Olt, LASL H-4.



Edward F. Hammel, CMF-9, leads the symposium on cryochemistry at the ACS meeting in Aubuquerque. LASL scientists presented 22 papers at the meeting, and several served as chairmen for various meeting functions.

what's doing

LOS ALAMOS FILM SOCIETY: "Dimka," (Russian drama), Dec. 21, 7 and 9 p.m., Civic Auditorium.

TRAVEL SLIDE and FILM PROGRAM: Mesa Public Library, Jan. 5, 7:30 p.m., "India," program by Berlyn Brixner.

PUBLIC SWIMMING, Los Alamos High School Pool, Adults 35 cents, children 15 cents. Saturday and Sunday 1 to 6 p.m.; Monday, Tuesday, and Wednesday 7:30 to 9:30 p.m.

SKI AND SKATE SALE: Thursday, Dec. 15, Recreation Hall, 7 to 9 p.m.

LOS ALAMOS SKATING ASSOCIATION: Schedule for use of local ice rink, Los Alamos Canyon:

Mondays: After-school session, 3 to 5 p.m. (Small children encouraged to attend.) General skating, 7 to 9:30 p.m. (Family night—special family rate $1.25.)

Tuesdays: "Mothers and Tots" session, 9:30 to 11:30 a.m.; After-school session, 3 to 5 p.m.; adults only, 7:30 to 10 p.m.

Wednesdays: After-school session, 3 to 5 p.m.; general skating, 7 to 9:30 p.m.; hockey team, 9:30 to 10:30 p.m.

Thursdays: "Mothers and Tots" session, 9:30 to 11:30 a.m.; after-school session, 3 to 5 p.m.; Figure Skating Club patch session, 6 to 7:30 p.m.; adults only, 7:30 to 10 p.m.

Fridays: After-school session, 3 to 5 p.m.; "Game Night" (primarily for teenagers), 7 to 9:30 p.m.

Saturdays: Hockey during the morning; general skating, 2 to 4:30 p.m.; "Date Night" (high school and young adults), 7 to 10 p.m.

Sundays: Professional lessons during the morning; general skating, 2 to 4:30 p.m.; Figure Skating Club patch session, 6 to 7:30 p.m.; adults only, 7:30 to 10 p.m.

Season tickets $3 for students through high school; $5 for adults. General admission students 25c, adults 50c. Rink telephone is 2-4500.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leader for information about specific hikes.

Saturday, Dec. 10, snowshoe/ski trip or hike depending on weather conditions. Virginia Winsor, leader.

Thursday, Jan. 5, meeting—place to be announced.

Saturday, Jan. 7, snowshoe/ski trip or hike. Bob Skaggs, leader.

20 years ago in los alamos

Culled from the files of the Los Alamos Times, December, 1946, by R. Y. Porton

They're on KP in Company E

For the first time since Los Alamos became a military post, the Special Engineering Detachment recently began doing kitchen police in their mess hall. This has now become one of the regular routine duties of SED's, due to the West Mesa being recently placed under the full military operation and control of Company E. Men of higher grade were victims of pranks on the first day the KP's went into action. Some of their buddies put white towels over the ends of their bunks, with the results that they found themselves summarily awakened by the CQ with a gruff, "All right, fellow—time to get down to the kitchen."

Anniversary

Monday, December 2, the anniversary of the first successful atomic chain reaction furnace, was observed here, when the Project invited news men to inspect new construction which will make the Hill a permanent community—the world's capital of atomic research Representatives of United Press, Associated Press, and the Santa Fe New Mexican met with Dr. Alvin Graves and Dr. Darol K. Froman, Los Alamos division leaders. Both men participated on that historic day under the stands of Stagg Field, Chicago—the day it was discovered men could not only release atomic energy but also control it.

Streets Named As Contest Closes

Names for the community's three main east-west thoroughfares were selected this week from scores of entries submitted. Canyon Road, Trinity Drive and Central Avenue were the winning names picked by a town council committee headed by Robert J. Van Gemert, chairman. Winners were chosen on the basis of setting, historic background, and community interest. (Editor's Note: Canyon Road was selected by Suzanne Krainock, CMF-4.)

Lab Launches Courses for Tech Personnel

A series of seven courses will be instituted next week as part of the training program with the Los Alamos Laboratory, according to Dr. Norris E. Bradbury, director. Academic standard will be maintained and accreditation may be possible through the courses, which will be given without charge. Courses and instructors include: Radiochemistry by Dr. Roderick Spence, Nuclear Physics by Dr. John Manley, and Continuous Group Theory by Dr. Stanislaw Ulam.